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New onset and exacerbation of psoriasis after COVID-19 vaccination

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INTRODUCTION

The messenger RNA (mRNA)-1273 (Moderna) and BNT162b2 (Pfizer-BioNTech) vaccines were granted emergency use authorization during the ongoing COVID-19 pandemic by the United States Food and Drug Administration in December 2020.[1] An adenoviral vector vaccine Ad26.COV2.S (Janssen) was similarly approved for use in February 2021.[1] To date, over 168.4 million people in the United States of America have been fully vaccinated.[2]

Psoriasis is a chronic, inflammatory skin condition that an estimated 7.55 million adults live with nationwide.[3] As patients on immunosuppressive therapy were excluded from vaccine clinical trials, there is no data on the efficacy and safety of the novel vaccines in this patient population. While uncommon, a potential association has previously been documented between new onset or exacerbation of psoriasis in response to vaccination against Bacillus Calmette-Guérin (BCG), influenza, tetanus-diphtheria, and pneumococcal polysaccharide.[4-12] This response has been documented in inactivated, attenuated, toxoid, and polysaccharide types of vaccines but not in the novel mRNA vaccine clinical trial data.

We present a series of postvaccination exacerbation and new-onset psoriasis and review similar reports from publicly available nationwide Center for Disease Control (CDC) Vaccine Adverse Events Reporting System (VAERS) data. As vaccination against COVID-19 continues worldwide, it is essential to recognize and understand the possible adverse events in psoriasis patients.

Abbreviations used:

BCG:	Bacillus Calmette-Guérin
CDC:	Center for Disease Control
Th:	T helper
VAERS:	Vaccine Adverse Events Reporting System

METHODS

A retrospective case series study was performed at the Department of Dermatology at Mount Sinai Hospital in New York City to assess new-onset psoriasis or exacerbation of existing disease after COVID-19 vaccination. All patients were referred to the Mount Sinai Dermatology Service from March to August 2021. Patient demographic information, medical history, medications, allergies, vaccine manufacturer, latency, treatment, and outcomes were collected and reviewed.

A retrospective review of the CDC VAERS of all reports from December 2020 to August 2021 was conducted using the search terms "psoriasis," "guttate psoriasis," and "erythrodermic psoriasis." Reports that were related to a non-COVID 19 vaccine, such as vaccines for herpes zoster or influenza, were excluded from the analysis. Reports that did not provide enough clinical information, such as the time to onset, clinical description, symptoms, or confirmation by laboratory findings, biopsy, or diagnosis by a physician, were excluded.

RESULTS

All 7 patients (median [range], 68 [27-89] years; 57.1% men) experienced new-onset or flares in

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Table I. Main characteristics of patients with new or exacerbated psoriasis after receiving COVID-19 vaccine

Patient no.	Age (y)	Sex	Vaccine	Onset*	Psoriasis symptoms	Physical examination	Treatment	Outcome	Previous COVID-19
1	76	M	Moderna	62	Flare	Scalp, inner ears, chest, arms, legs, buttocks 55% BSA	Apremilast, NBUVB† phototherapy	Improved	Yes
2	89	M	Moderna	24	New onset	Scalp, torso, arms, legs 60% BSA	Ixekizumab Acitretin 25 mg	Resolved	No
3	69	M	Moderna	21	Flare	Face, torso, groin, arms, legs 60% BSA	Apremilast, tildrakizumab	Resolved	Yes
4	68	F	Moderna	6	Flare	Scalp, arms, legs, feet 10% BSA	Risankizumab	Unknown	No
5	67	M	Moderna	60	Flare	Scalp, trunk, arms, legs, feet 35% BSA	Tildrakizumab, clobetasol	Improved	Yes
6	52	F	Moderna	7‡	Flare	Scalp, face, trunk, arms 30% BSA	Risankizumab, clobetasol, mometasone, triamcinolone	Improved	Yes
7	27	F	Pfizer	90	Flare	Scalp, elbow, thigh, knee <10% BSA	Clobetasol	Improved	Yes

BSA, Body surface area; *F*, female; *M*, male.
*Days after second vaccination.
†Narrow-band ultraviolet B radiation.
‡Patient experienced flare 7 days after the first vaccination, and a second flare 7 days after the second vaccination.

psoriasis after receiving COVID-19 vaccination. Six patients received the Moderna vaccine, while 1 received the Pfizer vaccine. The main characteristics of these patients are displayed in Table I. Only 1 patient had no history of psoriasis before vaccination. One patient reported a severe flare in psoriasis 7 days after the first dose of the vaccine and a second exacerbation 7 days after her second dose. All the other patients only experienced symptoms after the second dose. Five out of 7 patients tested positive for prior COVID-19 infection. The median latency for the onset of flare or new-onset psoriasis was 24 days following the administration of the second vaccine dose (range, 6-90 days).

The CDC VAERS database search revealed 79 patients (mean ± SD age, 56.2 ± 14.9 years; 53 [67.1%] women) who experienced new onset or exacerbation of psoriasis after the COVID-19 vaccines. The summary of demographics and clinical data from the CDC VAERS data review is described in Table II. A total of 57 (72.2%) patients had known psoriasis, and 22 (27.8%) reported new-onset psoriasis. Of the patients with newly diagnosed psoriasis, 6 were determined to be of the guttate subtype. Overall, the majority had received the Pfizer-BioNTech vaccine (38, 48.1%), followed by the Moderna (34, 43.0%) and the Janssen (7, 8.9%) vaccine.

The days to symptom onset ranged from 0 to 65 days after the first injection (median, 6 days). For the 7 recipients of the Janssen vaccine, the days to symptom onset ranged from 4 to 17 days. Of the 56 patients whose symptoms began after the first dose of the Pfizer-BioNTech or Moderna vaccines, 5 patients reported worsening psoriasis after the second dose as well. Fourteen (17.7%) of all patients reported onset of symptoms after the second dose of the Pfizer-BioNTech or Moderna vaccines only.

DISCUSSION

We report 7 patients who experienced an exacerbation of known psoriasis and one patient with new-onset psoriasis following vaccination against COVID-19 with the Pfizer and Moderna vaccines. Six of our patients presented with their symptoms after the second dose of the vaccine only, with 1 patient reporting flares after each dose. Most of our patients had previously tested positive for COVID-19 infection. While limited due to the self-reported nature of the database, the CDC VAERS data also reported numerous patients who experienced both new onset and worsening of known psoriasis following Moderna, Pfizer-BioNTech, and Janssen vaccines. Unlike our cohort, most of the CDC patients (60, 76%) experienced their symptoms after the first dose or within 28 days of the vaccine, with 5 who reported worsening after receiving a second dose.

Previous studies have reported influenza (H1N1), tetanus-diphtheria, BCG, and pneumococcal

Table II. Demographic and clinical characteristics of subjects from the Center for Disease Control Vaccine Adverse Events Reporting System reporting psoriasis following COVID-19 vaccination

Total no. of subjects	79
Sex, n (%)	
Female	53 (67.1)
Male	25 (31.6)
Unknown	1 (1.3)
Age (y), mean ± SD	56.2 ± 14.9
Vaccine, n (%)	
BNT162b2 (Pfizer-BioNTech)	38 (48.1)
mRNA-1273 (Moderna, Inc)	34 (43.0)
Ad26.COV2.S (Janssen Pharmaceuticals, Inc)	7 (8.9)
Symptom code, n (%)	
Psoriasis	36 (45.6)
Condition aggravated	27 (34.2)
Biopsy*	11 (13.9)
Guttate psoriasis	4 (5.1)
Autoimmune condition	1 (1.3)
Days to onset, n (%)	
0-7 days	45 (57.0)
8-27 days	15 (19.0)
≥ 28 days	14 (17.7)
Unspecified	5 (6.3)
New-onset psoriasis, n (%)	
Total	22
Guttate	6 (27.3)
Plaque	16 (72.7)
Exacerbation of known disease, n (%)	
Total	57
Guttate	1 (1.8)
Plaque	56 (98.2)

*Includes "biopsy," "biopsy skin," and "biopsy skin abnormal."

pneumonia vaccination as a triggering factor for new-onset or flare of psoriasis.[4-12] To date, there is 1 published case report describing a psoriasis flare-up 5 days after the second dose of the Pfizer-BioNTech vaccine.[13] Potential cutaneous adverse events following COVID-19 vaccination were described in a registry-based study of 414 cases and included delayed large local reactions, local injection-site reactions, urticarial eruptions, morbilliform reactions, pernio, cosmetic filler reactions, herpes zoster, herpes simplex flares, and pityriasis rosea-like reactions.[14] However, only 2 psoriasis flares were recorded in this cohort, which the authors noted to be rare.

Currently, there is no well-understood pathologic mechanism for new-onset or flares of psoriasis following vaccination. Previous studies have demonstrated a significant increase in interleukin 6 production and, in turn, T helper 17 (Th17) cell development after BCG, tetanus-diphtheria, and influenza vaccines.[4] Additionally, elevated Th17 responses have been observed in patients with severe COVID-19 disease.[15] As increasing evidence points to Th17 cells having a role in the pathogenesis of psoriatic disease, it can be hypothesized that perhaps the COVID-19 mRNA vaccines induce elevation of interleukin 6 and Th17 cells, which can contribute to the onset or flare of new psoriasis in a subset of patients.

To determine the incidence of flares or new-onset psoriasis for each COVID vaccine, we encourage health care professionals to submit cases to the American Academy of Dermatology registry (available at https://www.aad.org/member/practice/coronavirus/registry). As the world continues to undergo COVID-19 vaccination and booster vaccine shots in the near future, further studies should be carried out to investigate the potential association between new-onset and exacerbation of psoriasis and COVID-19 vaccines.

LIMITATIONS

The case series presented was from a small sample size in a single geographic location during a short period of time, which limits its generalizability. The CDC VAERS database collects self-reported symptoms from patients and physicians and is thus subject to reporting bias if they believe that the vaccine was the cause. The data may include incomplete, inaccurate, coincidental, and unverified information.

Conflicts of interest

Dr Lebwohl is an employee of Mount Sinai Dermatology, which receives research funds from Regeneron-Sanofi, Abbvie, Novartis, Amgen, Eli Lilly, UCB Inc, Janssen Research and Development, LLC, and Ortho Dermatologics. He has been the principal investigator for numerous clinical trials but has no personal financial gain. Authors Wei, Kresch, and Elbogen have no conflicts of interest to declare.

REFERENCES

1. COVID-19 vaccines. US Food and Drug Administration. Accessed August 18, 2021. https://www.fda.gov/emergency-preparedness-and-response/coronavirus-disease-2019-covid-19/covid-19-vaccines
2. COVID data tracker. Centers for Disease Control and Prevention. Data as of: August 15, 2021 6:00 am ET. Accessed August 15, 2021. https://covid.cdc.gov/covid-data-tracker/#vaccinations_vacc-total-admin-rate-total
3. Armstrong AW, Mehta MD, Schupp CW, Gondo GC, Bell SJ, Griffiths CEM. Psoriasis prevalence in adults in the United States. *JAMA Dermatol*. 2021;157(8):940-946. https://doi.org/10.1001/jamadermatol.2021.2007
4. Gunes AT, Fetil E, Akarsu S, Ozbagcivan O, Babayeva L. Possible triggering effect of influenza vaccination on psoriasis. *J Immunol Res*. 2015;2015:258430. https://doi.org/10.1155/2015/258430

5. Raaschou-Nielsen W. Psoriasis vaccinalis; report of two cases, one following BCG vaccination and one following vaccination against influenza. *Acta Derm Venereol*. 1955; 35(1):37-42.
6. Sbidian E, Eftekahri P, Viguier M, et al. National survey of psoriasis flares after 2009 monovalent H1N1/seasonal vaccines. *Dermatology*. 2014;229(2):130-135.
7. Shin MS, Kim SJ, Kim SH, Kwak YG, Park HJ. New onset guttate psoriasis following pandemic H1N1 influenza vaccination. *Ann Dermatol*. 2013;25(4):489-492.
8. Shi CR, Nambudiri VE. Widespread psoriasis flare following influenza vaccination. *Vaccine*. 2017;35(36):4785-4786.
9. Macias VC, Cunha D. Psoriasis triggered by tetanus-diphtheria vaccination. *Cutan Ocul Toxicol*. 2013;32(2):164-165.
10. Yoneyama S, Kamiya K, Kishimoto M, Komine M, Ohtsuki M. Generalized exacerbation of psoriasis vulgaris induced by pneumococcal polysaccharide vaccine. *J Dermatol*. 2019; 46(11):e442-e443.
11. Grafanaki K, Vryzaki E, Georgiou S, Liga M. Double trouble: influenza and pneumococcal vaccine exacerbation of psoriasis in a new-onset polycythemia vera patient. *J Dermatol*. 2020; 47(7):e263-e264.
12. Munguía-Calzada P, Drake-Monfort M, Armesto S, Reguero-Del Cura L, López-Sundh AE, González-López MA. Psoriasis flare after influenza vaccination in Covid-19 era: a report of four cases from a single center. *Dermatol Ther*. 2021;34(1):e14684. https://doi.org/10.1111/dth.14684
13. Krajewski PK, Matusiak Ł, Szepietowski JC. Psoriasis flare-up associated with second dose of Pfizer-BioNTech BNT16B2b2 COVID-19 mRNA vaccine. *J Eur Acad Dermatol Venereol*. 2021; 35(10):e632-e634. https://doi.org/10.1111/jdv.17449
14. McMahon DE, Amerson E, Rosenbach M, et al. Cutaneous reactions reported after Moderna and Pfizer COVID-19 vaccination: a registry-based study of 414 cases. *J Am Acad Dermatol*. 2021;85(1):46-55. https://doi.org/10.1016/j.jaad.2021.03.092
15. Wu D, Yang XO. TH17 responses in cytokine storm of COVID-19: an emerging target of JAK2 inhibitor Fedratinib. *J Microbiol Immunol Infect*. 2020;53(3):368-370. https://doi.org/10.1016/j.jmii.2020.03.005